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Allis - Chalmers

Manufacturing Company

Crushing and Cement Machinery Department

Bulletin No. 1415

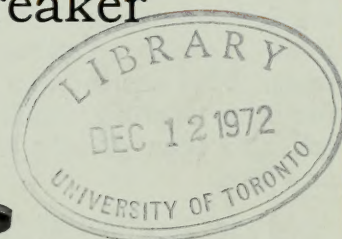
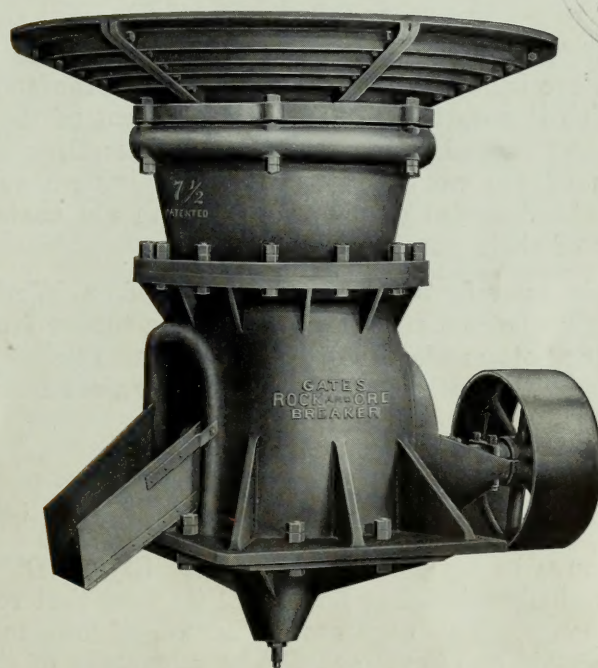
Reprint

January, 1914

Gates Rock and Ore Breaker

STYLE "D"

Plate No. 703G.



Allis-Chalmers Style "D" Gates Rock and Ore Breaker.

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The Development of the Gyratory Rock Breaker

The gyratory rock breaker was invented to overcome the numerous objections to the jaw crusher—the only type of machine then known for reducing rock. The jaw crusher was of limited capacity, its product was not uniform and the machine itself was subject to frequent breakages, due to the severe shocks it had to sustain. These shocks are intermittent, and such a machine must have strength far in excess of what is required when the crushing or breaking is constant. The gyratory breaker had to win its way to favor against the prejudices of those who, from long using, had become accustomed to former types of machines, but today its advantages are fully recognized. Its introduction has given employment to vast numbers of men in stone quarries and mines, and it has reduced the cost of breaking stone to a minimum. This has led to a more extended use of crushed stone for railroad ballast, for concrete work and for road-making material. The cost of producing the metals has also been greatly lowered by the installation of this machine to break up ore and flux.

From the time of the first application of the gyratory principle to rock breaking, Gates Breakers have been built by Allis-Chalmers Manufacturing Company or the Gates Works, which it absorbed and, the development of the machines to meet growing needs has never lagged. More than 7,000 Gates Breakers are in use, distributed in all parts of the world. That they are giving absolute satisfaction is evidenced by the constant receipt of new orders from old customers who are increasing the capacity of their plants.

The type formerly manufactured by the Gates Iron Works was known as Style "B". This had its bottom plate supported by a timber frame, and the entire breaker rested upon the bottom plate, so that if it became necessary to remove the eccentric and bevel gear, the entire breaker had to be raised from the bottom plate.

STYLE "D" BREAKER.

The principal change in the construction of the Style "D" Breaker is in the design of the bottom shell, which has flanges at its base that rest upon a foundation of timber or masonry. This construction admits of lowering the bottom plate together with the eccentric and bevel gear. The advantage of this arrangement is that the operator is enabled to gain access to the working parts of the breaker without moving the entire machine. Sufficient space is provided in the foundation to allow the bottom plate to be lowered by long bolts, thereby exposing the eccentric and bevel gear; these parts can then be readily moved out on light rails to a position where they can be inspected and repaired. The advantage of this construction is evident and will commend itself to intending purchasers. Another import-

STYLE "D" GATES ROCK AND ORE BREAKER

ant change is in the main bearing for the countershaft, which is made a part of the bottom shell and is of ample length. By making the main bearing an integral part of the shell, it must always be in alignment. It is constructed with large oil reservoirs and fitted with oiling chains. With each machine a special mandrel is furnished for rebabbiting this bearing, thus putting the means of repair in the hands of the operator.

The countershaft is extended so that a back gear drive for either an elevator or screen, or both, may be used if for any reason it is preferable to drive them in this manner rather than from a line shaft. An extra pillow block is furnished with each breaker for this extension to be used as an outboard bearing. The fact that the countershaft is self-aligning (due to the method of babbiting with patent mandrel, as shown in Plate No. 455G following), and that the outboard bearing needs only to be lined up to the countershaft, will be appreciated by all good mechanics. The foundations for these breakers are constructed for an outboard bearing, as shown in the illustrations on pages 14-17.

GENERAL DESCRIPTION OF THE GATES GYRATORY ROCK AND ORE BREAKER.

The heavy outer shell of the Gates Breaker is somewhat like an hour-glass in shape. It is open at the top for receiving rock and has a spout inclined from one side of its lower lobe for discharging. From just below the mouth down to the place of the smallest diameter is the throat of the machine, where the actual rock breaking is accomplished.

The main shaft, supported by the bottom plate, passes through the throat and has keyed to it at that point a massive cone-like head, free to move within the throat walls, which are reinforced for wear.

The action of the head is somewhat peculiar, as it has a circular and rolling movement and approaches successively every point of the interior of the throat. This is accomplished by causing a movement of the lower end of the axis of the shaft around a small circle; the universal character of the spider journal at the top making this possible; consequently the axis of the main shaft is always slightly inclined to the true vertical axis of the machine.

This action results in breaking the material, which then drops through by a continuous action at the successive places around the throat from which the head is most distant. The concave shape of the throat only permits the material to be in contact at its edges. This results in a clear break of the rock rather than crushing, so that the product is nearly cubical in form. The broken material falls on an inclined diaphragm, which protects the eccentric and gear. Passing over the diaphragm, it discharges itself at the spout by gravity.

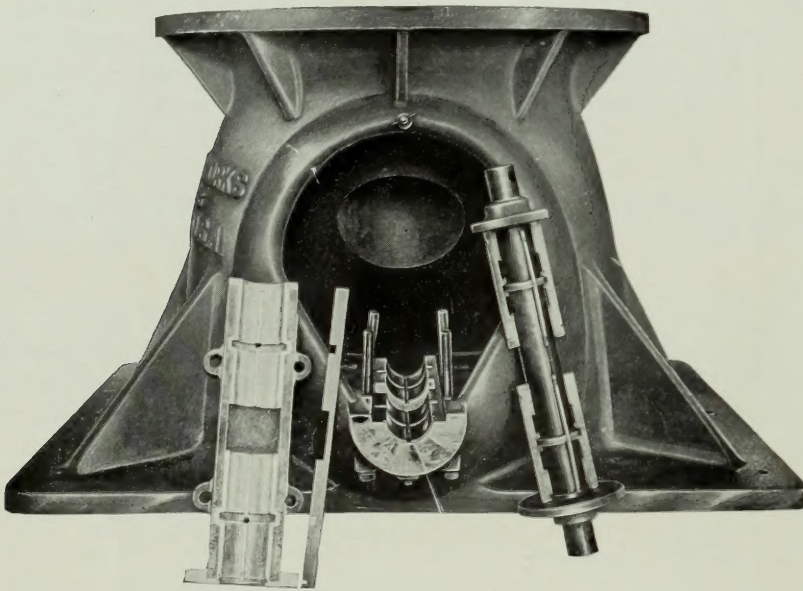
The lower end of the shaft passes through a sleeve, which is bored off the center one-half the diameter of the required gyration, and attached thereto is a gear to which power is transmitted from the band wheel.

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Material, falling between the inclined surface of the head and the oppositely inclined walls of the throat, by contact causes the shaft to slowly rotate on its axis in a direction opposite to its rapid gyratory movement.

The main shaft is adjustable and can be raised or lowered to regulate the size of the opening between concaves and head. This provides for altering the sizes of the product or for taking up the wear and keeping the product uniform.

Plate No. 455G.



Countershaft Bearing.

Babbitting mandrel with box and cap after babbitting, also shim strips, one in place. Shim strips have notches cut to correspond with openings for oiling chains, and a smaller one at the outer end for the groove, intended to prevent the oil from crawling on the countershaft beyond the end of the box.

The above illustration shows the Countershaft Bearing and the Patented Babbitting Mandrel furnished with breakers. This mandrel casts a double chain oiling box, also a babbitted face on the inside for the pinion to bear against, and a babbitted face on the outside end for the band wheel to bear against. It is self-aligning, which insures the pinion always meshing properly with the gear wheel. It expedites the work of rebabbitting the box and restores the box to its original condition.

STYLE "D" GATES ROCK AND ORE BREAKER

WHY GATES BREAKERS CUBE BEST.

The inner surface of the liners being concave in form, a space is left behind the central portions of the pieces of rock or ore, which, as they drop into place, are supported only at the ends. This facilitates a clean break when the piece is struck in its center by the gyrating head or cone, and less power is required for the work. The advantage of this should be strikingly apparent to every one. As an illustration: If one were to attempt to break a piece of wood by a blow, he would hardly select a flat surface upon which to lay the wood, but would place it so that the support would be at each end. This form of breaking surface also, in a great degree, prevents flat pieces from falling through, doing away with the objectionable spalls, and explaining why the Gates Breaker has acquired its established reputation for producing a more perfect cubiform stone than any other machine.

Plate No. 473.

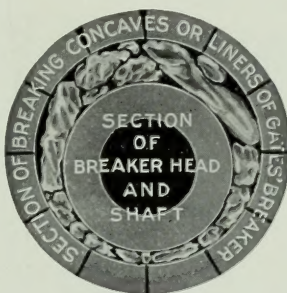
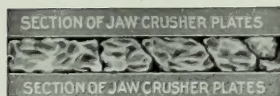


Plate No. 474G.



Illustrations showing the difference in action between the Gates Gyratory Rock and Ore Breaker and the Jaw Crusher.

THE BEST MECHANICAL CONSTRUCTION.

The claim that Gates Breakers have reached the highest point in mechanical construction is justified by the long experience of its builders, which has led to the use of materials best adapted for severe strains and service. This machinery is all made by gauges and templates, insuring an accurate fit of duplicate parts. Allis-Chalmers Manufacturing Company's trade is so large that it continually carries a stock, not only of finished machines but of duplicate parts, insuring prompt delivery. The Company's engineers are constantly engaged in solving problems connected with the advancement of this particular industry of breaking rock and ore. The fact that the largest corporations, including the leading mining and railroad companies, rely upon Allis-Chalmers Manufacturing Company for plans and specifications of crushing plants is a matter of greatest pride.

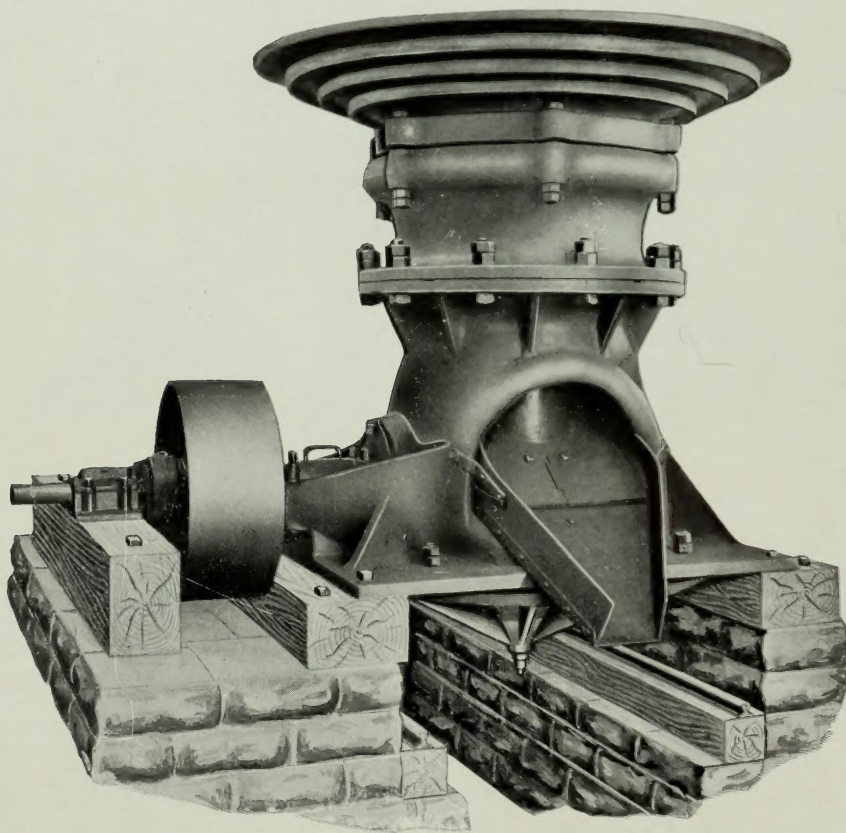
ALLIS-CHALMERS MANUFACTURING COMPANY

RIGHT ANGLE DRIVEN GATES BREAKERS.

Style "D" Breakers are also so constructed as to permit of their being driven at right angles to the discharge opening of the machine when this is necessary or desirable, as may be seen by the illustrations on pages 6 and 7 (Plates 853 and 2773).

The advantages derived from this improvement are numerous. Where a very compact arrangement of the machinery in a plant is desired and where more than one breaker discharges into one elevator, the desirability of the arrangement is obvious. It does away with bevel gears, special countershafts and other transmitting machinery and permits, in many cases, of the machine being belted directly

Plate No. 853.



Right Angle Driven Gates Breaker.

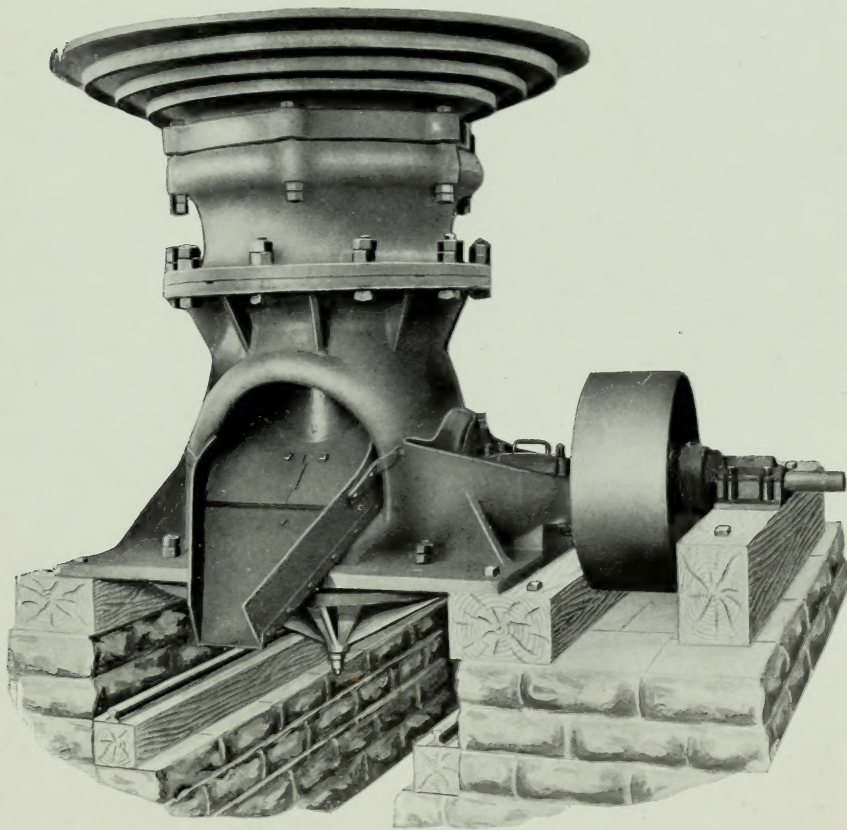
This has the band wheel on the left-hand side of machine when looking into the discharge opening. The outboard bearing pillow block shown is used when foundations are constructed as per illustrations on pages 15 and 17.

STYLE "D" GATES ROCK AND ORE BREAKER

from the engine or main line shaft. The elimination of complicated transmission machinery will, of course, effect a saving in the cost of the installation, as well as in the economy of operation. In many cases the elevator and screen can be driven from the countershaft of this breaker without the use of bevel gears, by simply mounting a pulley on the projecting end of it.

If a purchaser should prefer this type to the regular or straight-driven machine illustrated on page 1, he should state in ordering upon which side of the machine he desires to have the hand-wheel placed—whether to the right or left of the breaker, the position being determined from the point where one would stand to look into the spout. Plates 853 and 2773 fully illustrate the arrangement in question.

Plate No. 2773.



Right Angle Driven Gates Breaker.

This has the band wheel on the right-hand side of the machine when looking into the discharge opening. The outboard bearing pillow block shown is used when foundations are constructed as per illustrations on pages 15 and 17.

ALLIS-CHALMERS MANUFACTURING COMPANY

CRUSHING HEADS AND MANTLES.

The crushing heads are made solid and of chilled iron but can be furnished, if desired (where the rock is exceptionally hard), with patented manganese steel gun-lock mantle. This mantle has been designed to fit over an iron center which is permanently attached to the shaft. The manganese steel, which is the replaceable part, is as light as is consistent with the necessary strength. This mantle is shown in Plate No. 7087.

The core or head center is fastened to the shaft in a manner similar to that used for the solid chilled iron head. It is made of cast iron and the lower edge is fashioned into two double spirals, the highest points of which run into the two slots in the sides of the core. The mantle is made of manganese steel and is fitted with two lugs at its lower end. The inside of the mantle is machined to perfectly fit the head center, so that it can turn upon it. After the mantle is slipped over the core, with the lugs passing through the slots, it is twisted slightly to make the lugs engage the spiral surfaces and thus draw the mantle firmly down on the head center. Any looseness of the mantle which develops as a result of the expansion and strainings of the metal is immediately and automatically taken up by the creeping of the shell on the core. The spirals are made with right and left threads, so that the breaker can be run in either direction. The construction of this device is most perfect, and its invention has solved one of the hardest problems found in reducing tough and hard rock.

POWER.

In estimating the power required to drive breakers, no allowance has been made for elevators or screens. It must be borne in mind that no close estimate can be made which will cover all sorts of rock and ore; and further, it should be observed that it requires much more power per ton to break rock to one-half inch than is required to break it to an inch. The tabulated estimates given below are intended to cover ordinary macadam or ore breaking. For fine breaking add liberally to the power. Long experience has demonstrated the reliability of the following general rule, applicable to breaking the hardest rock to 2½ inch ring, viz., "The Gates Breaker will not require over one horse-power per ton of rock broken per hour."

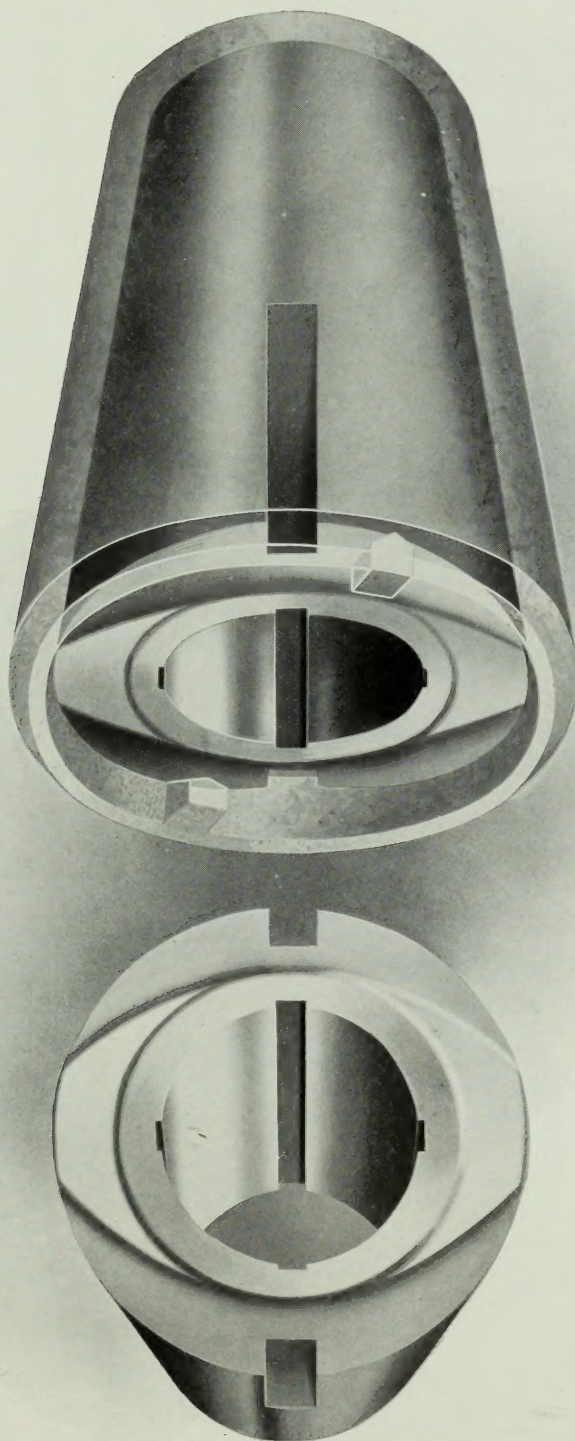
TABLE.

The following table gives the dimensions, weights and capacities of the Styles "D" and "F" Gates Rock and Ore Breakers, and the power required to operate them.

Size	Dimensions of each receiving opening about	Dimensions of receiving openings combined about	Weight of Breaker	Capacity per hour, according to character of rock or ore, in tons of 2000 lbs., with machine set for 2 ½ in. to 5 in. ring	Smallest size product can be made at one break.	Dimensions of driving pulley		Revolutions of driving pulley.	Horse Power Required
						Inches			
	Inches	Inches	Lbs.		Inch	Diam.	Face		
F	2x 6	2x12	650		¾	8	2 ⅝	700	1 to 1 ½
0D	4x15	4x30	3850	2 to 4	¾	16	6	500	3 to 4
1D	5x18	5x36	5900	4 to 8	1	20	7	475	5 to 8
2D	6x21	6x42	8400	6 to 12	1 ⅛	24	8	450	7 to 12
3D	7x22	7x45	14480	10 to 20	1 ⅜	28	10	425	10 to 16
4D	8x27	8x54	21700	15 to 30	1 ½	32	12	400	14 to 21
5D	10x30	10x60	30700	25 to 40	2	36	14	375	22 to 30
6D	11x36	11x72	43000	30 to 60	2 ¼	40	16	350	28 to 45
7 ½D	14x45	14x90	48000	75 to 125	3	44	18	350	50 to 75

STYLE "D" GATES ROCK AND ORE BREAKER

Plate No. 7087.



Manganese Steel Mantle and Head Center, showing the manner in which the mantle is applied and how it is held in place and locked fast on the head center.

ALLIS-CHALMERS MANUFACTURING COMPANY

GATES BREAKER OIL.

It is the utmost importance that good oil should always be used on breakers, as the necessity for more than one-half the repairs is attributable to the use of poor oil. Allis-Chalmers Manufacturing Company will furnish oil which has proved to be right, and earnestly solicits its use in preference to all others.

PRICES.

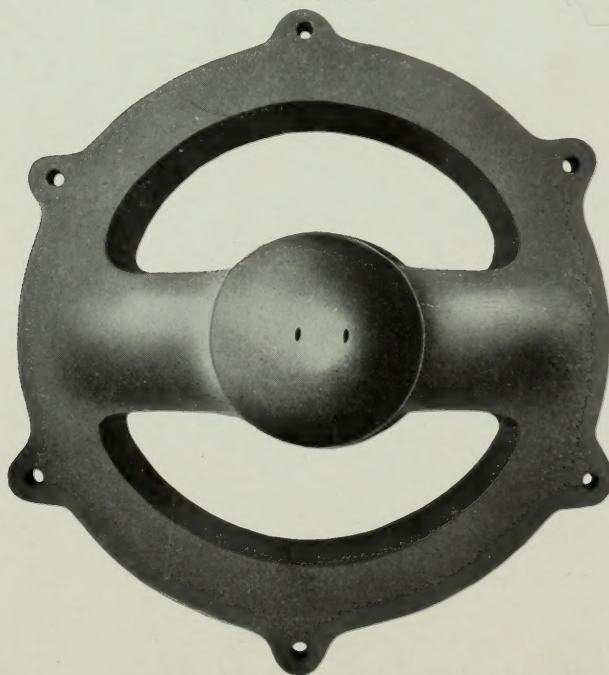
Full barrel	35 cents per gallon.
Half barrel	35 cents per gallon.
Ten gallons (\$1.00 added for can).....	45 cents per gallon.
Five gallons (\$0.75 added for can).....	45 cents per gallon.

TWO-ARM SPIDER.

Two-Arm Spiders, which are now supplied with Style "D" machines, greatly increase the facilities for feeding, thus reducing the cost of crushing. Feed openings of the various sizes are as follows:

No. 1,	2	openings,	5x18	inches,	instead of	3	openings,	5x12	inches.
No. 2,	2	"	6x21	"	"	3	"	6x14	"
No. 3,	2	"	7x22	"	"	3	"	7x15	"
No. 4,	2	"	8x27	"	"	3	"	8x18	"
No. 5,	2	"	10x30	"	"	3	"	10x20	"
No. 6,	2	"	11x36	"	"	3	"	11x24	"
No. 7½,	2	"	14x45	"	"	3	"	14x30	"

Plate No. 711G.



Two-Arm Spider.

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Any practical quarry man or contractor familiar with Gates Breakers will appreciate the advantages of this improvement, especially in handling slabby stone coming to the breaker in wide pieces which would have to be broken with a sledge in order to feed through the three-arm spider. Prices on this spider to owners of Gates Breakers will be gladly furnished.

BACK GEAR DRIVING CONNECTIONS.

Plate No. 687G on this page shows the Back Gear Driving Connections as attached to Gates Gyratory Breakers, from which to drive an elevator and a screen. This is a very convenient arrangement, and saves considerable room and expense in the erection of a stone crushing plant, wherever it can be introduced.

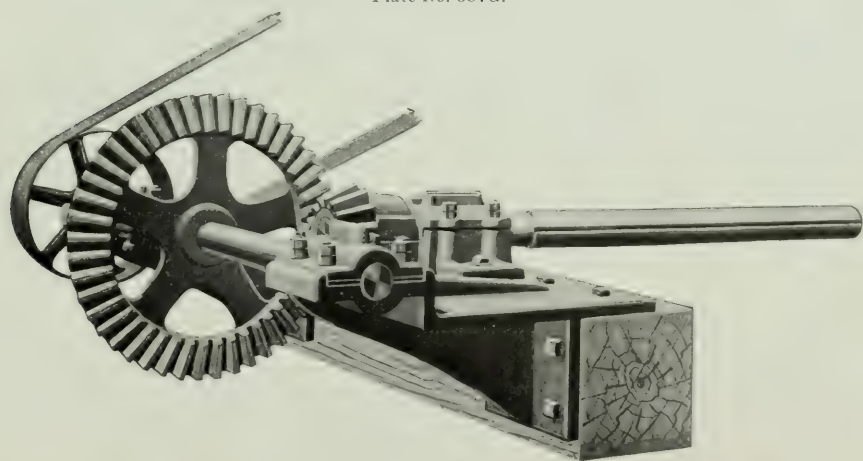
The pinion, as will be seen, is attached to the main countershaft of the breaker itself and transmits power to the bevel wheel, carried on an independent countershaft, which in turn carries a pulley, on which a belt is run leading to the elevator or screen. The back gear countershaft is carried on brackets attached to the timber frame on which the breaker rests.

This arrangement can be furnished for all sizes of Gates Gyratory Breakers to be used in connection with Allis-Chalmers Manufacturing Company's standard types of elevators or screens.

Allis-Chalmers Manufacturing Company will be pleased to quote special prices and to furnish further information concerning these Driving Connections upon application.

Size of Breaker	0	1	2	3	4	5	6	7 1/2
Revolutions of Back Gear Shaft.....	250	158	150	142	160	150	140	140

Plate No. 687G.



Back Gear Driving Connections.

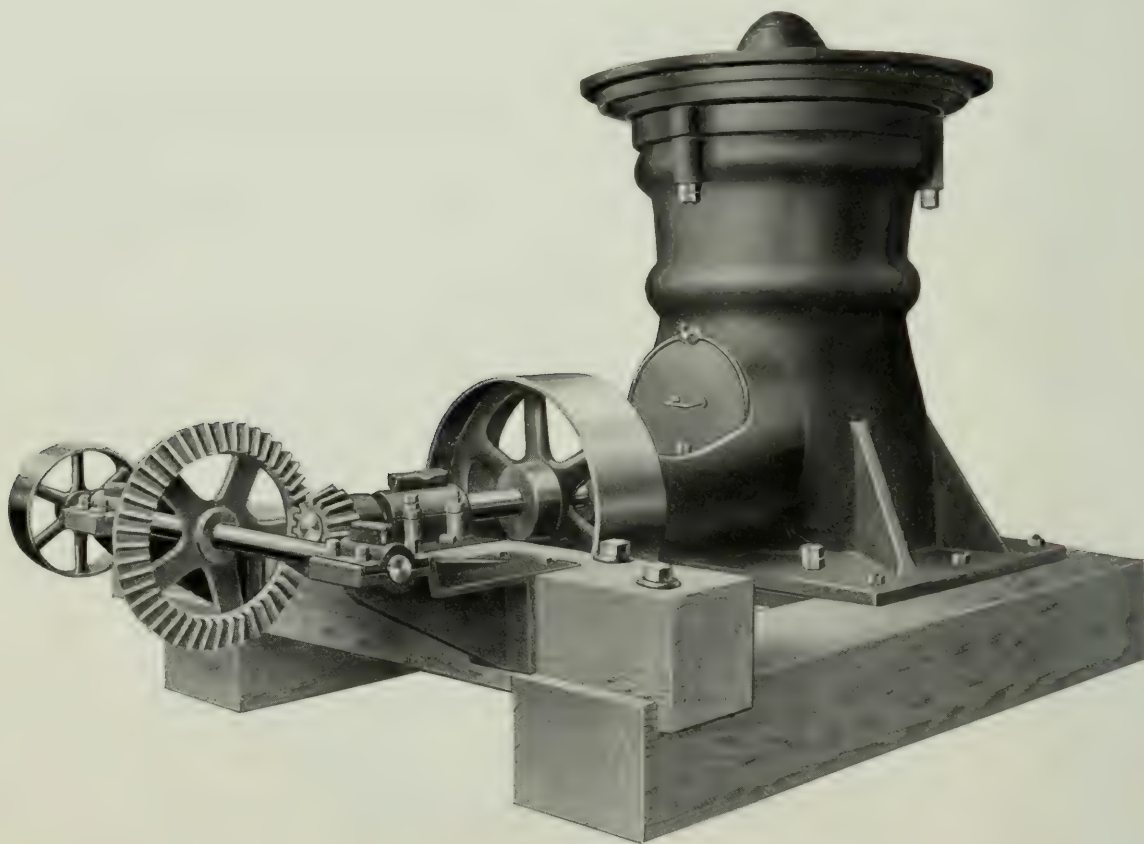
ALLIS-CHALMERS MANUFACTURING COMPANY

INFORMATION REQUIRED WHEN ORDERING BREAKERS OR REPAIRS.

It is absolutely essential that Allis-Chalmers Manufacturing Company know the nature of the material to be operated upon, and especially the maximum sized product required of the machine. This information is necessary in order to determine the size and style of head or cone, and the thickness of the concaves or liners to use in the breaker, to obtain as nearly as possible the desired results. The purchaser should therefore furnish this information at the time of ordering the breaker, as it will insure an earlier shipment and avoid dissatisfaction on the arrival of the machinery at its destination. Too much stress cannot be put on this point.

Do not fail to let this Company know what class of foundation will be used for the breakers, whether of masonry or timber, so that the proper setting plans may be furnished and thus permit the work of preparing the foundations to progress while the breakers are being built and shipped.

Plate No. 8815.



Size 3, Style "D" Gates Gyratory Breaker.

This has a solid shell with back gear driving connections attached. Iron work is furnished only for this back gear, or iron work with frame as shown.

STYLE "D" GATES ROCK AND ORE BREAKER

"SIZE" OF BROKEN STONE.

The size of broken or crushed stone is designated by different names, such as "2½-inch ring," "3-inch stone," "1-inch product," etc. Allis-Chalmers Manufacturing Company has adopted the first term, namely, "Ring," and means thereby all the stone coming from the breaker which can be passed (by hand) through a ring of the designated size.

Allis-Chalmers Manufacturing Company aims to furnish such size of head and thickness of concaves as will break the material so that 85 or 90 per cent. will pass the specified ring, with the breaker head in its lowest position, the 10 per cent. to 15 per cent. not small enough to be put through the ring by hand representing a majority of the flat or irregular pieces, sometimes called "spalls," but termed "rejection" by us.

These percentages are not guaranteed, as the cleavage of different kinds of material governs them, but this Company uses its best judgment, gained by a long and extended experience. Should the material not be of satisfactory size, the head, or concaves, or both, can be changed until proper sized material results.

Instruction Book No. 5000 entitled, "Instructions for Setting and Operating Style "D" Gates Rock and Ore Breaker," gives full information in regard to all matters connected with operating these breakers, and is sent out with all shipments of these machines.

Larger perforations in the sections of Allis-Chalmers screens are used than the respective size "ring" material called for, as material which has passed through a given sized perforation in a moving screen will pass through a somewhat smaller ring held in the hand. Therefore, if your contract specifies that the material must pass certain sizes of screen perforation, this Company should be notified of this, and it will undertake to adjust the breaker to these conditions, according to its best judgment.

Plate No. 8863.



DROP BOTTOM AND FOUNDATION.

The cut shows a timber work foundation, so arranged as to allow the bottom plate (with eccentric and gear) to be dropped and removed for inspection and repairs.

Allis-Chalmers Manufacturing Company will furnish drawings for foundations in all cases.

All measurements given in this book for foundations are approximate only.

ALLIS-CHALMERS MANUFACTURING COMPANY

Plate No. 3871.

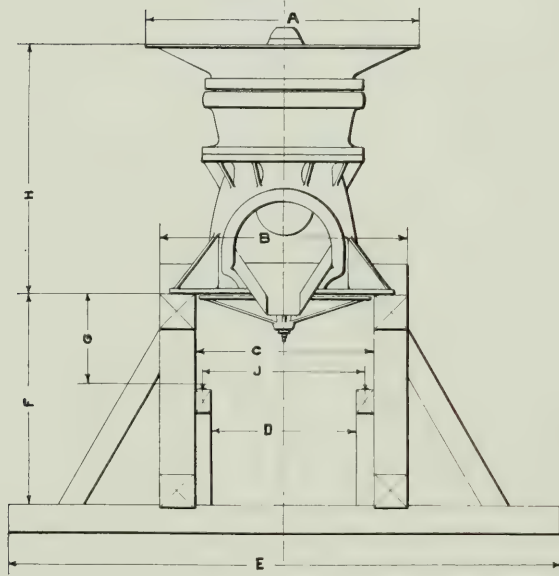
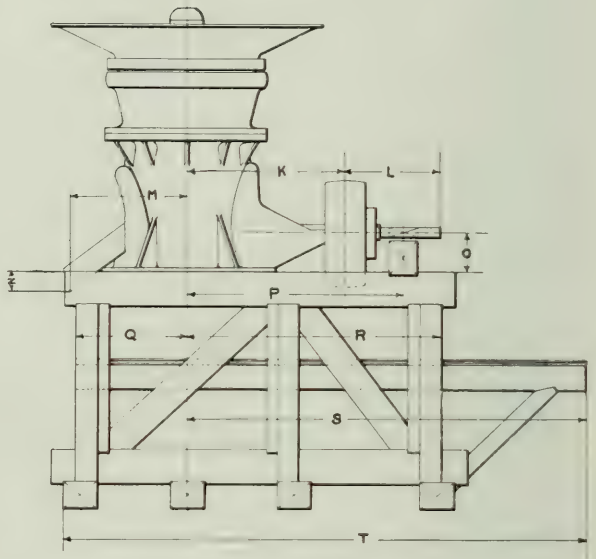


Plate No. 3875.



STYLE "D" BREAKER.

REGULAR DRIVE—TIMBER.

No.	A		B		C		D		E		F		G		H		J		K		L		M		N		O		P		Q		R		S		T		Pulley	Revs. per min
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	in.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	in.	
0	3-2	3-10	2-6		-22	9-0	3-4	-16	3-4	3 ³ / ₈	2-3	2-7	1 ¹ / ₁₆	-22	22	1 ¹ / ₂	6		5	7 ⁷ / ₈	3-8	-20	4-3	7-3	9-3	16x	6	1 ¹ / ₂												500
1	3-6	1 ¹ / ₄	4-4	2-8	2-0	9-6	3-9	-18	3-8	7 ⁷ / ₈	2-5	2-11	2-2	3 ³ / ₁₆	23	1 ¹ / ₂	4	1 ¹ / ₂	7	1 ¹ / ₄	4-1	1 ¹¹ / ₁₆	22	1 ¹ / ₂	4-11	3 ³ / ₈	8-6	10	8	1 ¹ / ₂	20x	7	1 ¹ / ₂						475	
2	3-10	1 ¹ / ₄	4-9	3-1	2-5	10-0	4-0	-22	1 ¹ / ₂	4-2	1 ¹ / ₈	2-9	3-3	3 ³ / ₁₆	2-4	3 ³ / ₄	2-2	1 ¹ / ₂	4	1 ¹ / ₂	8	7 ⁷ / ₈	4-8	1 ¹ / ₁₆	2-2	5-6	8-6	11-0	24x	8	1 ¹ / ₂								450	
3	4-6	1 ¹ / ₂	5-4	3-8	3-0	12-0	4-8	22	5-2	3-4	3-9	9	11 ¹ / ₁₆	2-7	3 ³ / ₈	2-8	1 ¹ / ₂	6		11	1 ¹ / ₄	5-4	1 ¹ / ₁₆	2-7	6-4	10-0	12-11	28x	10	1 ¹ / ₂								425		
4	6-7	3 ³ / ₄	6-6	4-6	3-6	14-0	5-4	2-2	6-5	3 ³ / ₁₆	4-1	4-2	2	15 ¹ / ₁₆	2-7	3 ³ / ₈	3-0	6		12	1 ¹ / ₄	5-9	5	15 ¹ / ₁₆	2-9	6-9	11-0	14-1	32x	12	5 ⁵ / ₈								400	
5	7-10	7-2	5-2	4-2	16-0	6-0	2-6	7-2	5	15 ¹ / ₁₆	4-8	4-6	6	1 ¹ / ₄	2-9	3-4	6			14	1 ¹ / ₈	6-2	1 ¹ / ₄	3-3	7-5	11-6	15-1	36x	14	3 ³ / ₄									375	
6	8-7	7-9	5-9	4-9	15-4	6-6	2-2	8-3	5 ⁵ / ₈	5-4	4-10	3	14	10 ³ / ₄	2-10	3 ³ / ₄	4-0	8	3 ³ / ₄	15	11 ¹ / ₂	6-7	1 ¹ / ₂	3-5	7-8	12-1	15-10	40x	16	3 ³ / ₄									350	
7	10-8	8-2	6-2	4-10	17-0	7-0	2-9	9-8	5-10	5-6	1 ¹ / ₈	3-1	7	8	4-4	9				15	1 ¹ / ₂	7-5	3-9	8-7	14-1	18-2	44x	19											350	

NOTE—In all cases get special plan for foundation. The dimensions given on this page are only intended as a preliminary guide.

STYLE "D" GATES ROCK AND ORE BREAKER

Plate No. 3873.

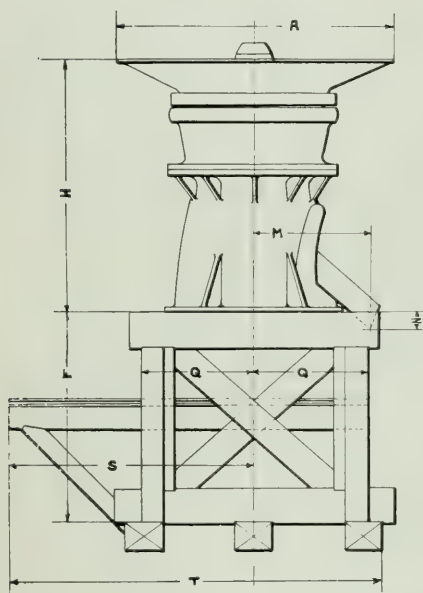
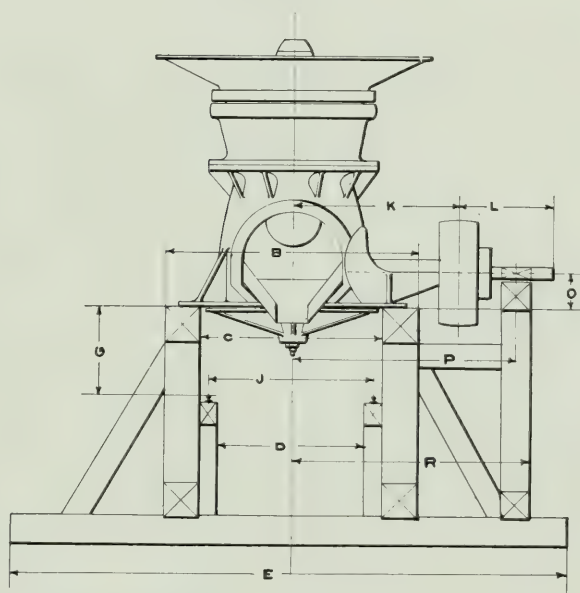


Plate No. 3877.



STYLE "D" BREAKER.

RIGHT ANGLE DRIVE—TIMBER.

No.	A		B		C		D		E		F		G		H		J		K		L		M		N	O	P		Q	R	S	T	Pulley	Revs. per min.																
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	in.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	in.															
0	3	2	3	10	2	6	—	22	9	4	3	4	—	16	3	4	3	2	7	16	—	22	22	12	6	5	7	3	8	16	—	20	3	11	4	6	6	6	16x 6	12	500									
1	3	6	1	4	4	2	8	2	0	10	0	3	9	—	18	3	8	7	8	2	5	2	11	2	3	16	—	23	12	4	1	2	7	1	4	4	2	—	22	12	4	6	5	0	7	2	12	20x 7	12	475
2	3	10	1	4	4	9	3	1	2	5	11	0	4	0	—	22	12	4	2	1	2	9	3	3	16	2	4	3	4	2	2	12	4	1	2	8	1	6	4	8	16	—	24x 8	12	450					
3	4	6	1	2	5	4	3	8	3	0	12	0	4	8	—	22	5	2	3	4	3	9	1	16	2	7	3	8	2	8	12	6	11	1	4	5	4	16	2	7	5	9	5	9	8	8	28x10	12	425	
4	6	7	3	4	6	6	4	6	3	6	14	0	5	4	2	2	6	5	16	4	1	14	2	16	2	7	3	8	3	0	6	12	1	4	5	9	16	2	9	6	2	16	6	6	9	7	32x12	5	400	
5	7	10	7	2	5	2	4	2	16	0	6	0	2	6	7	2	16	4	8	4	6	3	2	2	9	3	4	6	14	1	3	6	2	3	2	3	6	7	3	2	7	0	10	7	36x14	3	375			
6	8	7	7	9	5	9	4	9	15	4	6	6	2	2	8	3	5	8	5	4	4	10	3	4	2	10	3	4	4	0	8	3	4	6	7	1	2	3	5	7	7	1	2	7	10	11	7	40x16	3	350
7 1/2	10	8	8	2	6	2	4	10	17	0	7	0	2	9	9	8	5	10	5	6	16	3	1	7	8	4	9	15	1	2	7	5	3	9	7	11	9	3	13	4	44x19		350							

NOTE—In all cases get special plan for foundation. The dimensions given on this page are only intended as a preliminary guide.

ALLIS-CHALMERS MANUFACTURING COMPANY

Plate No. 3876.

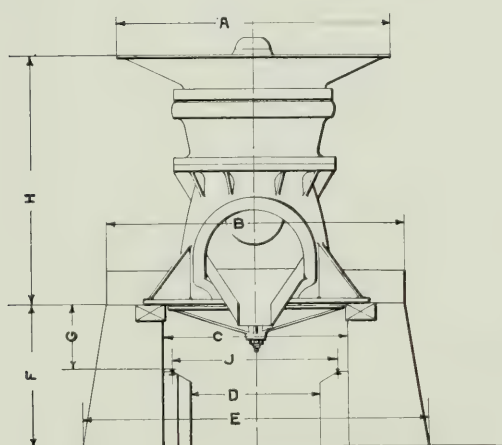
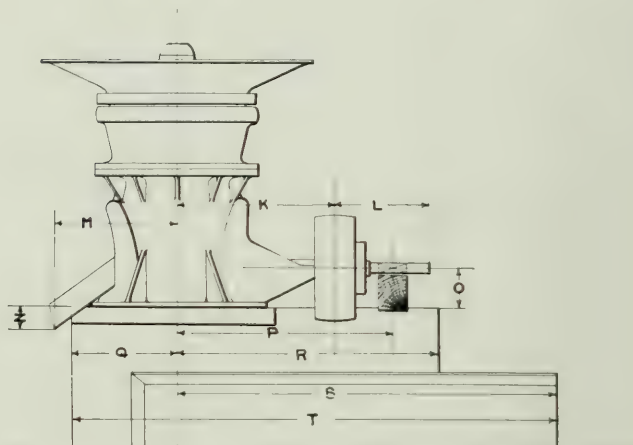


Plate No. 3874.



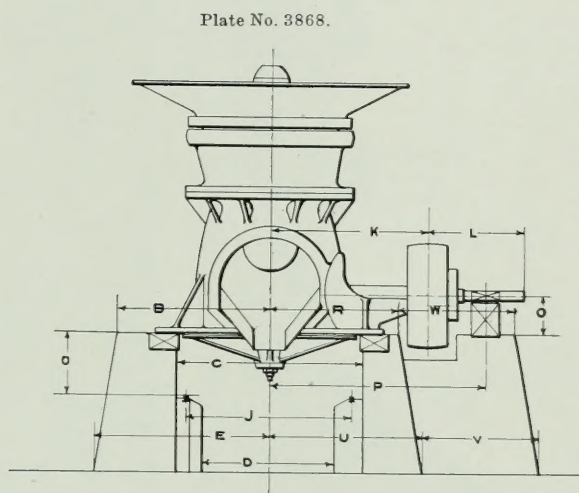
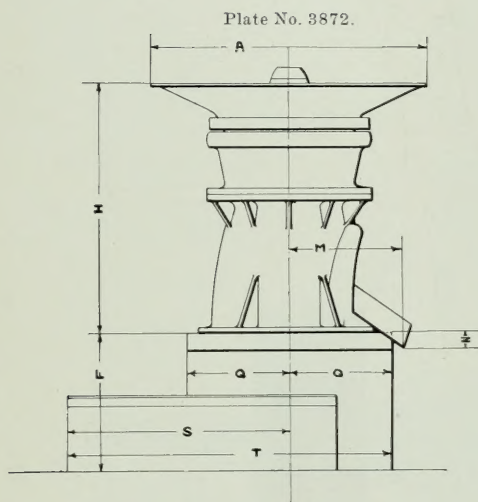
STYLE "D" BREAKER.

REGULAR DRIVE—MASONRY.

No.	A		B		C		D		E		F		G		H		J		K		L		M		N	O	P		Q		R		S		T		Pulley	Revs. per min.
	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	in.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	ft.	in.	in.	
0	3-	2	4-	6	2-7		15	5-10	3-	4	16	3-	4 ³ / ₈	2-3	2-7 ¹ / ₁₆	22		22 ¹ / ₂	6	5 ⁷ / ₈	3-	8	18	4-	5	6-9	8	3	16x	6 ¹ / ₂						500		
1	3-	6 ¹ / ₄	5-	1	2-9		17	6-	5	3-	6	18	3-	8 ⁷ / ₈	2-	5	2-11	2-	2 ³ / ₁₆	23 ¹ / ₂	4 ¹ / ₂	7 ¹ / ₄	4-	2	20	5-	2	7-4	9	0	20x	7 ¹ / ₂					475	
2	3-	10 ¹ / ₄	5-	10	3-2		21	7-	2	3-	9	22 ¹ / ₂	4-	2 ¹ / ₈	2-	9	3-	3 ⁵ / ₁₆	2-	4 ³ / ₄	2-	2 ³ / ₂	4 ¹ / ₂	8 ⁷ / ₁₆	4-	8 ¹ / ₁₆	2-	2	5	4	8	0	10-2	24x	8 ¹ / ₂			450
3	4	6 ¹ / ₂	6-	11	3-9		2-	5	8-	3	4-	0	22	5-	2	3-	5	3-	9 ¹ / ₁₆	2-	7 ³ / ₈	2-	8 ¹ / ₂	6	11 ¹ / ₄	5-	4 ¹ / ₁₆	2-	2	6-	3	9-5	11-7	28x10	1 ¹ / ₂			425
4	6-	7 ³ / ₄	7-	10	4-7		3-	2	9-	2	3-	11	22	6-	5 ³ / ₁₆	4-	1	4	2 ¹ / ₁₆	2	7 ³ / ₈	3-	0	6	12 ¹ / ₄	5-	9 ⁵ / ₁₆	2-	9	6-	11	10-7	13-4	32x12	5			400
5	7-	10	8-	8	5-3		3-	9	10-	0	4-	0	22	7-	2 ⁵ / ₁₆	4-	9	4-	6 ¹ / ₄	2-	9	3-	4	6	14 ¹ / ₈	6-	2 ¹ / ₄	3-	0	7-	6	11-0	14-0	36x14	3			375
6	8-	7	9-	6	5-9		4-	4	10-10	4-	1	2-	2	8-	3 ⁵ / ₈	5-	4	4	10 ³ / ₄	2-	10 ³ / ₄	4-	0	8 ³ / ₄	15 ¹ / ₂	6-	7 ¹ / ₂	3-	2	7-	7	12-3	15-5	40x16	3			350
7 ¹ / ₂	10-	8	10-	0	6-3		4-	10	11-10	5-	6	2-	9	9-	8	5-	10	5-	6 ¹ / ₈	3-	1 ⁷ / ₈	4-	4	9	15 ¹ / ₂	7-	5	3-	6	8-	5	13-7	17-1	44x19				350

NOTE—In all cases get special plan for foundation. The dimensions given on this page are only intended as a preliminary guide.

STYLE "D" GATES ROCK AND ORE BREAKER



STYLE "D" BREAKER.

RIGHT ANGLE DRIVE—MASONRY.

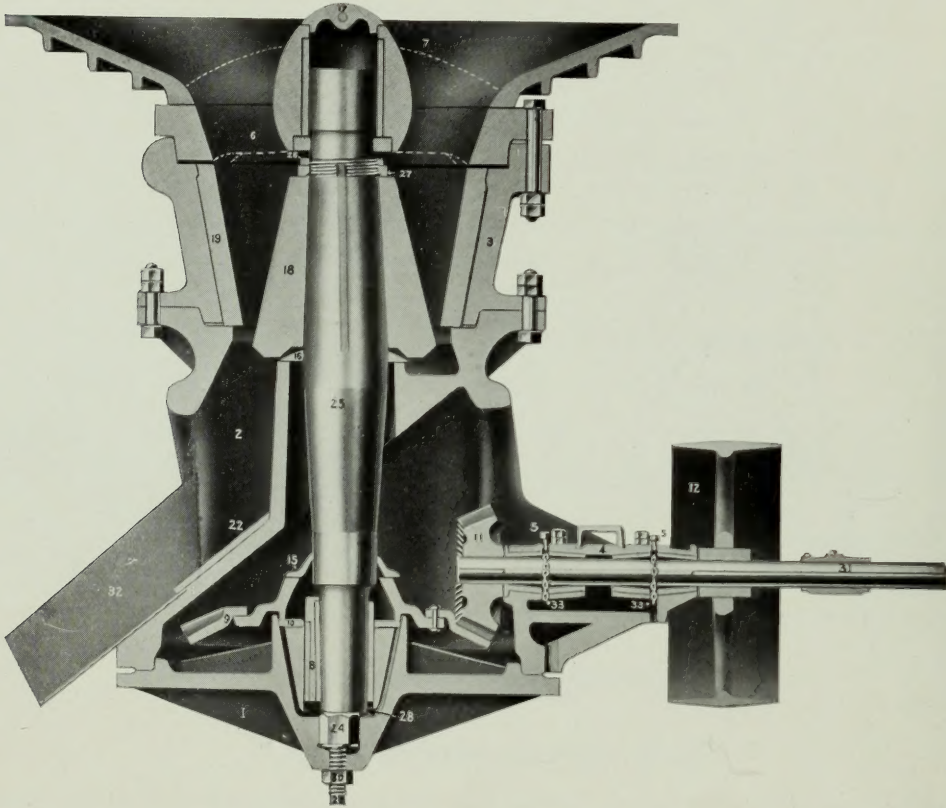
A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	Pulley	Revs. per min.
ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	in.	in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	in.	
3-2	2-3	2-7	-15	2-11	3-4	-16	3-4 ³ / ₈	2-3	2-7 ¹ / ₁₆	-22	-22 ¹ / ₂	6	5 ⁷ / ₈	3-8	-18	2-3	3-10	5-4	2-11	2-2	2-2	16x 6 ¹ / ₂	500
3-6 ¹ / ₄	2-6 ¹ / ₂	2-9	-17	3-2 ³ / ₂	3-6	-18	3-8 ⁷ / ₈	2-5	2-11	2-2 ³ / ₁₆	-23 ¹ / ₂	4 ¹ / ₂	7 ¹ / ₄	4-2	-20	2-5 ¹ / ₂	3-10	5-6	3-1 ¹ / ₂	2-8	2-8	20x 7 ¹ / ₂	475
3-10 ¹ / ₄	2-9	3-2	-21	3-5	3-9	-22 ¹ / ₂	4-2 ¹ / ₈	2-9	3-3 ⁵ / ₁₆	2-4 ³ / ₄	2-2 ¹ / ₂	4 ¹ / ₂	8 ¹ / ₁₆	4-8 ¹ / ₁₆	2-2	2-9	4-10	7-0	3-5	2-6	2-6	24x 8 ¹ / ₂	450
4-6 ¹ / ₂	3-5 ¹ / ₂	3-9	2-5	4-1 ¹ / ₂	3-10	-22	5-2	3-5	3-9 ¹ / ₁₆	2-7 ³ / ₈	2-8 ¹ / ₂	6	11 ¹ / ₄	5-4 ¹ / ₁₆	2-2	3-0 ¹ / ₂	5-4	7-6	3-8 ¹ / ₂	3-0	3-0	28x10 ¹ / ₂	425
6-7 ¹ / ₄	3-11	4-7	3-2	4-7	3-11	-22	6-5 ⁵ / ₁₆	4-1	4-2 ¹ / ₁₆	2-7 ³ / ₈	3-0	6	12	5-9 ⁵ / ₁₆	2-4	3-6	5-10	8-2	4-2	3-0	3-0	32x12 ⁵ / ₈	400
7-10	4-4	5-3	3-9	5-0	4-0	-22	7-2 ¹ / ₁₆	4-9	4-6 ⁷ / ₃₂	2-9	3-4	6	14 ¹ / ₈	6-2 ³ / ₃₂	2-11	3-8	6-4	9-3	4-4	3-4	3-4	36x14 ³ / ₄	375
8-7	4-0	5-9	4-4	4-8	4-1	2-2	8-3 ⁵ / ₈	5-4	4-10 ³ / ₄	2-10 ³ / ₄	4-0	8 ³ / ₄	15 ¹ / ₂	6-7 ¹ / ₂	3-2	4-0	7-10	11-0	4-8	3-7 ¹ / ₂	3-7 ¹ / ₂	40x16 ³ / ₄	350
10-8	4-6	6-3	4-10	5-5	5-6	2-9	9-8	5-10	5-6 ¹ / ₈	3-1 ⁷ / ₈	4-4	9	15 ¹ / ₂	7-5	3-6	4-6	8-8	12-2	5-5	3-10	3-10	44x19	350

NOTE—In all cases get special plan for foundation. The dimensions given on this page are only intended as a preliminary guide.

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ALLIS-CHALMERS MANUFACTURING COMPANY

Plate No. 8816.



SECTIONAL VIEW
STYLE "D"—GATES ROCK AND ORE BREAKER.

The names of the several parts designated by numbers in the above illustration may be found in the following table:

1—Bottom Plate.	11—Bevel Pinion.	25—Main Shaft.
2—Bottom Shell.	12—Band Wheel.	26—Upper Ring Nut.
3—Top Shell.	15—Oil Bonnet.	27—Lower Ring Nut.
4—Bearing Cap.	16—Dust Ring.	28—Steel Step.
5—Oil Nipple and Cap.	17—Dust Cap.	29—Lighter Screw.
6—Spider.	18—Head.	30—Lighter Screw, Jam Nut.
7—Hopper.	19—Concaves.	31—Counter Shaft.
8—Eccentric.	22—Chilled Wearing Plates.	32—Spout.
9—Bevel Wheel.	24—Octagon Step.	33—Oiling Chain.
10—Wearing Ring.		

Allis-Chalmers Manufacturing Company's

PRINCIPAL PRODUCTS

AGRICULTURAL MACHINERY

Farmer Tractors
Rotary Soil Tillers

AIR BRAKES

AIR COMPRESSORS

Steam Driven
Belt Driven
Electrically Driven, Portable
Electrically Driven, Stationary
Hydraulic Driven

CEMENT MACHINERY

Ball Mills
Ball Tube Mills
Balls, Forged
Crushing Rolls
Elevators
Feeders
Gyratory Breakers
Hoists
Mixing Pans
Perforated Metals
Revolving Screens
Rotary Coolers and Dryers
Rotary Kilns
Tube Mills
Tube Mill Linings
Tube Mill Pebbles

COAL MINING MACHINERY

Barney Cars
Crushing Rolls
Hoisting Cages
Revolving Screens
Shaking Screens
Ventilating Fans

CONDENSERS

Barometric
Jet
Surface

CRUSHING MACHINERY

Ballast Plants
Crushing Rolls
Dumping Skips
Elevators
Gyratory Breakers
Jaw Crushers
Macadam Plants
Perforated Metals
Portable Crushing Plants
Revolving Screens
Quarry Cars

ENGINES

Corliss Engines
Gas Engines
Diesel Oil Engines
Blowing Engines
Rolling Mill Engines

FORGINGS

PERFORATED METALS

FLOUR MILL MACHINERY

Aspirators
Bolters, Universal
Bolting Cloth
Bolting Cloth Cleaners
Bran and Shorts, Dusters
Bran Packers
Conveyors, Spiral
Corn Mills
Fans
Feed Mills
Feed Screens
Flour Dressers
Flaking Machines
Flour Feeders and Mixers
Flour Packers
Granulators
Purifiers
Reels
Rolls
Roller Mills
Rolling Screens
Scalpers

HOISTS

Electric Driven
Steam Driven

HYDRAULIC MACHINERY

Francis Turbines
Impulse Wheels
Oil Pressure Governors
Pressure Regulators
Accessories

MANGANESE BRONZE CASTINGS

MINING MACHINERY

Amalgam Appliances
Chilian Mills
Concentrating Plants
Conveyors
Copper Converting Plants
Cyanide Plants
Elevators
Frue Vanners
Gold and Silver Mills
Gyratory Breakers
Huntington Mills
Jaw Crushers
Jigs
Lead Refining Plants
Mine Ventilating Machinery
Mortar Mills
Ore Buckets
Ore Feeders
Prospecting Mills
Roasting Furnaces
Sampling Plants
Skips
Smelting Machinery
Stamps, Atmospheric
Stamps, Gravity
Stamps, Steam
Tube Mills, Wet and Dry

POWER TRANSMISSION MACHINERY

Belt Tighteners
Boxes
Couplings
Gears
Hangers
Pulleys
Rope Sheaves
Shafting

PUMPING MACHINERY

Centrifugal Pumps
Fire Service Pumps
Geared Pumps
"High Duty" Pumping Engines
Hydraulic Transmission Pumps
Screw Pumps

ROLLING MILL MACHINERY

SAW MILL MACHINERY

Band Mills, Double Cutting
Band Mills, Single Cutting
Band Mills, Telescopic
Band Re-saws, Horizontal
Band Re-saws, Vertical
Board Lifters, Steam
Cant Flippers, Steam
Canting Machine, Overhead
Carriages
Circular Saw Mills
Conveying Machinery
Cutting Off Saws, Steam Feed
Edgers
Edging Grinders
Feeds, Steam, Direct Acting
Feeds, Steam, Twin Engine
Filing Room Tools
Lath Mills and Bolters
Live Rolls and Drives
Log Chains
Log Jacks
Log Loaders
Log Turners
Niggers, Steam
Set Works
Slashers
Steam Feed Valves
Stock Lifters, Steam
Transfers
Trimmers

SUGAR MACHINERY

TIMBER TREATING AND PRESERVING MACHINERY

TURBINES—STEAM

TURBINES—WATER

ELECTRICAL APPARATUS

ALTERNATING CURRENT GENERATORS AND MOTORS

Belted Type Generators	Water-wheel Type Generators	Synchronous Motor-Generator Sets	Induction Motors
Engine Type Generators	Synchronous Frequency Changers	Induction Motor-Generator Sets	Transformers
Fly-wheel Type Generators	Induction Motor Frequency Changers	Synchronous Motors	Rotary Converters
Turbo Generators		Synchronous Condensers	

DIRECT CURRENT GENERATORS AND MOTORS

Belted Type Generators	Small Bipolar and Multipolar Motors and Generators	Multiple Voltage Balancing Sets
Engine Type Generators	Electric Railway Equipments, Motors, Controllers, etc.	Multiple Voltage Variable Speed Equipments

SWITCHBOARDS FOR DIRECT CURRENT AND ALTERNATING CURRENT

Allis-Chalmers Manufacturing Company

General Offices . . . Milwaukee, Wis.

DISTRICT OFFICES:

Atlanta, Ga., 1104 Healey Bldg.	Los Angeles, Cal., Title Insurance Bldg.
Boston, Mass., 50 Congress St.	Milwaukee, Wis., West Allis Works.
Buffalo, N. Y., Ellicott Square Bldg.	Minneapolis, Minn., Corn Exchange Bldg.
Chicago, Ill., Peoples Gas Bldg.	New Orleans, La., Maison Blanche Bldg.
Cincinnati, O., First National Bank Bldg.	New York, N. Y., 50 Church Street.
Cleveland, O., Schofield Bldg.	Philadelphia, Pa., 903 Pennsylvania Bldg.
Dallas, Texas, Sumpter Bldg.	Pittsburgh, Pa., 1209 Park Bldg.
Denver, Colo., First National Bank Bldg.	Portland, Ore., 92 First St.
Detroit, Mich., Ford Bldg.	St. Louis, Mo., Railway Exchange Bldg.
Duluth, Minn., Alworth Bldg.	Salt Lake City, Utah, Kearns Bldg.
El Paso, Texas, 2900 San Diego St.	San Francisco, Cal., Rialto Bldg.
Indianapolis, Ind., 516 Traction Terminal Bldg.	Seattle, Wash., 115 Jackson Street.
Kansas City, Mo., Waldheim Bldg.	Toledo, O., Ohio Bldg.

FOREIGN DISTRICT OFFICES:

London, England, 732 Salisbury House, London Wall, E. C.
Santiago, Chile, Huerfanos 1157, Casilla 2653.

CANADIAN REPRESENTATIVES:

Canadian Allis-Chalmers, Limited: Toronto, Ont.

FOREIGN SALES AGENCIES:

Auckland, New Zealand,	John Chambers & Sons, Ltd.
Bombay, India,	Marshall Sons & Co.
Buenos Aires, Argentine Republic,	American Trading Company.
Calcutta, India,	Marshall Sons & Co.
Honolulu, Hawaii,	Honolulu Iron Works
Ipoh, Federal Malay States,	McAlister & Co., Ltd.
Johannesburg, South Africa,	Herbert Ainsworth.
Kobe, Japan,	American Trading Company.
Manila, Philippine Islands,	American Trading Company.
Paris, France,	R. Sequin.
Perth, West Australia,	Frank R. Perrot.
Rio de Janeiro, Brazil,	American Trading Company.
Petrograd, Russia,	International Engineering & Trading Co.
Shanghai, China,	American Trading Company.
Singapore, Straits Settlements,	McAlister & Co., Ltd.
Sydney, Australia,	Frank R. Perrot.
Sydney, Australia,	Standard-Waygood, Ltd.
Yokohama, Japan,	American Trading Company.